

CLAIMS

1. A hydrofluoric acid wastewater treatment method comprising the following steps:

5 a hydrofluoric acid concentration step comprising concentrating hydrofluoric acid wastewater by evaporation to produce a concentrated hydrofluoric acid water and a hydrofluoric acid-containing vapor;

10 a dissolution step comprising bringing the hydrofluoric acid-containing vapor obtained in the hydrofluoric acid concentration step into contact with dissolution water to dissolve the vapor;

15 a neutralization step comprising bringing the residual hydrofluoric acid-containing vapor left from the dissolution step into contact with an alkali to produce a neutralized liquid and a dehydrofluorinated vapor; and

a condensation step comprising condensing the dehydrofluorinated vapor obtained in the neutralization step to produce condensed water.

20 2. A method according to claim 1 further comprising a neutralized liquid separation step comprising separating the neutralized liquid obtained in the neutralization step into hydrofluoric acid-containing water, alkali-containing water and desalted water using ion exchange membranes.

25 3. A method according to claim 1 further

comprising:

a neutralized liquid concentration step comprising bringing the condensed water obtained in the condensation step into contact with an alkali and/or bringing the dehydrofluorinated vapor before condensation in the condensation step into contact with an alkali to produce a neutralized liquid, followed by concentrating the neutralized liquid by evaporation to produce a concentrated neutralized liquid and a re-dehydrofluorinated vapor; and

a concentrated neutralized liquid separation step comprising separating the concentrated neutralized liquid obtained in the neutralized liquid concentration step into hydrofluoric acid-containing water, alkali-containing water and desalted water using ion exchange membranes.

4. A method according to claim 1, wherein the hydrofluoric acid concentration step further comprises concentrating by evaporation the hydrofluoric acid-containing vapor solution obtained in the dissolution step.

5. A hydrofluoric acid wastewater treatment method comprising the following steps:

a first concentration step comprising concentrating hydrofluoric acid wastewater by evaporation to produce a concentrated hydrofluoric acid water and a hydrofluoric acid-containing vapor;

a neutralization-condensation step comprising neutralizing and condensing the hydrofluoric acid-containing vapor obtained in the first concentration step to produce a neutralized liquid;

5 a second concentration step comprising concentrating the neutralized liquid obtained in the neutralization-condensation step to produce a concentrated neutralized liquid; and

a separation step comprising separating the concentrated  
10 neutralized liquid obtained in the second concentration step into hydrofluoric acid-containing water, alkali-containing water and desalted water using ion exchange membranes.

6. A hydrofluoric acid wastewater treatment  
15 device for treating wastewater containing hydrofluoric acid, comprising:

a hydrofluoric acid concentrator for concentrating hydrofluoric acid wastewater by evaporation to produce a concentrated hydrofluoric acid water and a hydrofluoric  
20 acid-containing vapor;

a water contactor for bringing the hydrofluoric acid-containing vapor obtained by the concentrator into contact with dissolution water to dissolve the vapor;

an alkali contactor for bringing the residual  
25 hydrofluoric acid-containing vapor left from the water

contactor into contact with an alkali to produce a  
neutralized liquid and a dehydrofluorinated vapor; and  
a condenser for condensing the dehydrofluorinated vapor  
obtained by the alkali contactor to produce condensed  
5 water.

7. A hydrofluoric acid wastewater treatment  
device according to claim 6 further comprising a separator  
for separating the neutralized liquid obtained by the  
alkali contactor into hydrofluoric acid-containing water,  
10 alkali-containing water and desalted water using ion  
exchange membranes.

8. A hydrofluoric acid wastewater treatment  
device according to claim 7 further comprising a  
neutralization-concentration apparatus for bringing the  
15 condensed water obtained by the condenser into contact  
with an alkali and/or bringing the dehydrofluorinated  
vapor before condensation in the condenser into contact  
with an alkali to produce a neutralized liquid, and  
concentrating the neutralized liquid by evaporation to  
20 produce a concentrated neutralized liquid and a re-  
dehydrofluorinated vapor;

the separator being configured to separate the  
concentrated neutralized liquid obtained by the  
neutralization-concentration apparatus and the neutralized  
25 liquid obtained by the alkali contactor together into

hydrofluoric acid-containing water, alkali-containing water and desalted water using ion exchange membranes.

9. A hydrofluoric acid wastewater treatment device for treating wastewater containing hydrofluoric acid, comprising:

a first concentrator for concentrating hydrofluoric acid wastewater by evaporation to produce a concentrated hydrofluoric acid water and a hydrofluoric acid-containing vapor;

10 a neutralizer and condenser for neutralizing and condensing the hydrofluoric acid-containing vapor obtained by the first condenser to produce a neutralized liquid;

a second concentrator for concentrating the neutralized liquid obtained by the neutralizer and condenser to produce a concentrated neutralized liquid;

15 a separator for separating the concentrated neutralized liquid obtained by the second concentrator into hydrofluoric acid-containing water, alkali-containing water and desalted water using ion exchange membranes.